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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/805,606      | 03/12/2001  | I. Lee Davis         | 1082-471            | 9295             |

7590 06/03/2004

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EXAMINER

BRODA, SAMUEL

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 06/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                 |              |
|------------------------------|-----------------|--------------|
| <b>Office Action Summary</b> | Application No. | Applicant(s) |
|                              | 09/805,606      | DAVIS ET AL. |
| Examiner                     | Art Unit        |              |
| Samuel Broda                 | 2123            |              |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 12 March 2001.  
 2a) This action is **FINAL**.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-37 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-37 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date July 2001.

4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.  
 5) Notice of Informal Patent Application (PTO-152)  
 6) Other: \_\_\_\_\_.

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## **DETAILED ACTION**

1. Claims 1-37 have been examined.

### ***Drawings***

2. This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

### ***Specification***

3. The disclosure is objected to because of the following informalities: the Specification at least at page 45 line 18 and page 135 line 17 contains missing information regarding the Figure referenced in the text. Correction is required.

The lengthy Specification has not been checked to the extent necessary to determine the presence of all possible minor errors such as those noted above. Applicants' cooperation is requested in correcting any errors of which Applicants may become aware in the Specification.

### ***Claim Rejections - 35 U.S.C. § 112, First Paragraph***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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**4.1** Claims 1-37 are rejected under 35 U.S.C. 112, first paragraph, because the Specification, while being enabling for creating a simulated particle pack, does not reasonably provide enablement for creating an actual particle pack. The Specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

**4.2** Regarding claims 1-37, all independent claims are directed at methods, apparatuses, or machine-readable media for “placing a plurality of particles . . . to create a particle pack.” Such language reasonably includes in scope the placement of actual (physical) particles that form an actual (physical) particle pack.

However, the Specification appears to only teach the placement of simulated particles to form a simulated particle pack that is based on the random selection of simulated particles from N categories. The Specification and accompanying figures describe the computer hardware and software necessary to perform such a simulation; the Specification and accompanying figures do not appear to teach one skilled in the art how to construct an actual particle pack consisting of actual (physical) particles.

***Claim Rejections - 35 U.S.C. § 112, Second Paragraph***

**5.** The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**5.1** Claims 13, 26, and 36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

**5.2** Regarding claim 13, this claim is dependent on itself, stating “A method as recited in claim 13.” For the purpose of further examination, claim 13 is considered as dependent on claim 12.

**5.3** Claims 26 and 36 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. Although claims 26 and 36 are apparatus claims, the omitted steps are the steps(s) that perform a looping procedure for selecting and placing particles until all particles are placed; as currently written the apparatus appears to only place one selected particle.

***Indication of Allowable Subject Matter***

6. Subject to rejections listed above, and based on the prior art located to date and made of record, claims 1-37 do not appear to be taught or rendered obvious, and are indicated as allowable subject matter.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to Applicants' disclosure. Reference to Fu et al, "Particle Packing by Kinematics and Dynamics Simulations," American Society of Civil Engineers, 14<sup>th</sup> Engineering Mechanics Conference, pp. 1-5 (May 2000)(paper available at <http://www.ce.utexas.edu/em/2000/>), is cited as teaching a simulation method for random packing of spherical particles of multiple sizes by performing separate kinematics and dynamics simulations.

Reference to Sutou et al, "A Study of the Global Optimaization [sic] Approach to Spherical Packing Problems," Research Reports on Mathematical and Computing Sciences, Series B: Operations Research, pp. 1-26 (May 2000)(paper available at <http://citeseer.ist.psu.edu/sutou00study.html>), is cited as teaching a method of packing a set of unequal spheres in a polytope such that: (1) the packed spheres do not overlap, and (2) the sum of the volumes of the packed spheres is maximized.

Reference to Torquato et al, "Is Random Close Packing of Spheres Well Defined?" Physical Review Letters, Vol. 84 No. 10, pp. 2064-2067 (March 2000), is cited as teaching the mathematical definition of a "maximally random jammed state" in the random packing of identical spheres.

Reference to Nandakumar et al, "Predicting Geometrical Properties of Random Packed Beds from Computer Simulation," American Institute of Chemical Engineers, AIChE Journal,

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Vol. 45 No. 11, pp. 2286-2297 (November 1999), is cited as teaching an algorithm to analyze and predict the geometrical properties of a randomly packed structure using packing objects of arbitrary shape.

Reference to Ortega et al, "Optimizing Particle Packing in Powder Consolidation," American Ceramic Society Bulletin, Vol. 78 No. 8, pp. 106-111 (August 1999), is cited as teaching a method of enhanced particle packing using fluid consolidation and comparison of measured porosity results to a theoretical porosity.

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (703) 305-1026. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (703) 305-3900.



**SAMUEL BRODA, ESQ.  
PRIMARY EXAMINER**